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Industrial Materials Research Institute
Boucherville, Québec

FINAL REPORT

Use of CAD/CAM/CAE in the design of parts, dies and processes for the die casting industries

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TECSULT

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2	Letter of Introduction
3	Questionnaire
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1.0 EXECUTIVE SUMMARY

A survey of companies involved in the die casting and glass and ceramic moulding industries was done. These companies were either part designers, die and mould designers, die or mould manufacturers, part producers or suppliers of raw materials. The purpose of the survey was to measure the degree of interest and need in the industry for a proposed Computer Integrated Die Casting software package (CIDC). Two hundred and sixty eight questionnaires were mailed out. Ninety five companies responded. Nine questionnaires were returned by the Post Office. Eighty telephone interviews were conducted. Twelve personal interviews were conducted.

There are inumerable industries that depend on the die casting industry to produce high quality, precision parts economically. Chief among them are the automotive, aeronautic, appliance and decorative hardware industries. Notwithstanding the economic significance of the Canadian die casting industry, there are relatively few large companies and many smaller companies involved in die casting. There are ninety six companies registered as die casters with the Federal Department of Regional and Industrial Expansion.

Of the ninety five respondants forty seven (49,5%) stated that die casting is a significant part of their business. The tables and results presented here are for these fourty seven companies (unless otherwise stated).

The glass and ceramic industries showed very limited interest in the software, with only 16,7% indicating interest in what the package can do. These industries are omitted from the following analysis.

The proposed CIDC software is needed and wanted by the Canadian Die Casting Industry 78.7% replied they wanted a CIDC system. Nevertheless there are certain criteria that must be satisfied before the software package will realize its full potential for rendering Canadian Industry more efficient and competitive. These criteria include:

- Regardless of how sophisticated the functions performed by the program, its use must be simple and it must be easy to learn.

- The software must be designed so that it will be easy to interface with a number of CAD/CAM software-hardware combinations (the actual interfacing can be done by the CAD/CAM software producers).

- It must include calculations of gate placement, part removal (geometric aspects, parting line) metal flow and cooling (the CAD/CAM software will calculate part weight, part volume and generate NC programs to cut dies).

Without exception those contacted name the cost of the package as the paramount consideration. Although the economics or financing of the system were not part of the mandate, it is felt that a good CIDC software package will have a large positive economic impact on the Die Casting Industry in Canada. It is felt that these economic benefits will justify the expenditure necessary to develop the package.

Nevertheless, it is felt that not more than ten CIDC packages will be installed by die casting companies in

the first five years after its release. The number of CIDC packages sold in Canada will, in all probability, never be enough to defray the cost of development of the package.

Synergism and economy may be achieved by co-ordinating and co-operating with COMINCO Ltd as the company has an active product research center dedicated to solving the die casting problems. The company, through its senior market development engineer, has indicated it would be interested in exploring the possibility of co-operation.

A degree of product promotion can be achieved by installing the CIDC package in Quebec's CRIQ and Ontario's CAD/CAM center.

The percentage of interviewees who have purchased or have budgeted for CAD/CAM/CAE systems is 5%. The amount budgeted varies from less than 100 000$ to more than 1 000 000$ (this information was volunteered and thus is not complete).

Among those companies that did not respond there are some that are interested in acquiring the CIDC package (see RESULTS). But non respondents tend to be smaller companies and the percentage of non respondents that are interested is lower than that for respondents.

The following three tables summarize the survey results:

Table 1 - Mailings and Responses

Questionnaires Mailed	268	100.0%
Returned by Post Office	9	3.4%
Returned Completed	95	35.5%
Telephone Interviews	80	29.9%
Personal Interviews	12	4.5%

Table 2 - Overview of Responses

Responses	95	100.0%
Mistargeted Questionnaires	48	50.5%
Die Casters Responding	47	49.5%

Table 3 - Die Caster's Responses

Responses	47	100.0%
Interested in CIDC	37	78.7%
Wanting to Acquire	33	70.2%
Wanting to Access	4	8.5%
Willing to Participate	26	55.3%
Computer users	15	31.9%

2.0 DESCRIPTION OF SURVEY

A complete list of companies involved in Die Casting was compiled from 4 sources.

1. CRIQ's Directory of Quebec's industrial companies;
2. RIE's list of Canadian Die Casters
3. The Canadian Trade Index;
4. A list of injection molders that also die cast. from the Canadian Plastics Directory.

Duplicates were illiminated from the list by comparing company names, addresses and telephone numbers. This was done using specially written software.

A list containing 268 companies was compiled in this way (see Exhibit 1). All these companies were polled by mail (see Exhibits 2 & 3). Of these 9 companies or 3.4% have closed or moved leaving no forwarding address their questionnaires were returned by the post office. Ninety five companies or 35,5% of the sample replied.

Eighty companies or 29.8% of the sample were telephoned. Twelve companies or 4.5% of the sample were visited.

Of the ninety five respondents 48 or 50.5% said they never die cast, no longer die cast or that die casting is an insignificant portion of their business. Many of these are sand casters, investment casters or permanent casters. Some are now subcontracting the die casting operations. These companies are omitted from the following analysis and tables.

Twenty four companies were telephoned in order to determine why they had not responded to the questionnaire.

An analysis of number of positive responses as a function of source of company listing was done.

3.0 RESULTS

In the following tables: "responses" is the total number of respondents in the appropriate category, "interested" is the total number wishing to acquire or access a CIDC software package, "wanting to acquire" is that number wanting to acquire the CIDC software package, "Wanting to access" is that number wanting to access but not acquire a CIDC software package, "willing to participate" is that number in the sample willing to participate in the development of the CIDC software package, "computers users" is that number of respondents who use computers for whatever purpose. Those indicating a willingness to participate are probably those that have the strongest interest in the software.

Table 1 - Mailings and Responses

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Computer users	15	31.9%

Table 4 - Part Designer's Responses

Responses	19	100.0%
Interested	19	100.0%
Wanting to Acquire	16	84.2%
Wanting to Access	3	15.8%
Willing to Participate	12	63.2%
Computer Users	7	36.8%

Table 5 - Die Designer's Responses

Responses	32	100.0%
Interested	27	84.4%
Wanting to Acquire	24	75.0%
Wanting to Access	3	9.4%
Willing to Participate	19	59.4%
Computer Users	13	40.6%

Table 6 - Die Maker's Responses

Responses	30	100.0%
Interested	24	80.0%
Wanting to Acquire	22	73.3%
Wanting to Access	2	6.7%
Willing to Participate	15	50.0%
Computer Users	12	40.0%

Table 7 - Part Producer's Responses

Responses	29	100.0%
Interested	25	86.2%
Wanting to Acquire	22	75.9%
Wanting to Access	3	10.3%
Willing to Participate	19	65.5%
Computer Users	10	34.5%

Table 8 - Material Supplier's Responses

Responses	6	100.0%
Interested	4	66.7%
Wanting to Acquire	3	50.0%
Wanting to Access	1	16.7%
Willing to Participate	3	50.0%
Computer Users	1	16.7%

Table 9 - Responses from companies with 25 or fewer employees

Responses	14	100.0%
Interested	12	85.7%
Wanting to Acquire	11	78.6%
Wanting to Access	1	7.1%
Willing to Participate	7	50.8%
Computer Users	3	21.4%

Table 10 - Responses from companies with 26 to 50 employees

Responses	10	100.0%
Interested	5	50.0%
Wanting to Acquire	4	40.0%
Wanting to Access	1	10.0%
Willing to Participate	4	40.0%
Computer Users	4	40.0%

Table 11 - Responses from companies with 51 to 100 employees

Responses	4	100.0%
Interested	3	75.0%
Wanting to Acquire	3	75.0%
Wanting to Access	-	0.0%
Willing to Participate	2	50.0%
Computer Users	1	25.0%

Table 12 - Responses from companies with 101 to 200 employees

Responses	6	100.0%
Interested	5	83.3%
Wanting to Acquire	4	66.7
Wanting to Access	1	16.7%
Willing to Participate	2	33.3%
Computer Users	2	33.3%

Table 13 - Responses from companies with more than 200 employees

Responses	13	100.0%
Interested	12	92.3%
Wanting to Acquire	11	84.6%
Wanting to Access	1	7.7%
Willing to Participate	11	84.6%
Computer Users	6	46.2%

Table 14 - Responses from companies in Ontario

Responses	27	100.0%
Interested	21	77.8%
Wanting to Acquire	20	74.1%
Wanting to Access	1	3.7%
Willing to Participate	15	55.6%
Computer Users	11	40.7%

Table 15 - Responses from companies in Quebec

Responses	15	100.0%
Interested	12	80.0%
Wanting to Acquire	9	60.0%
Wanting to Access	3	20.0%
Willing to Participate	9	60.0%
Computer Users	5	33.3%

Table 16 - Responses from companies in other provinces

Responses	5	100.0%
Interested	4	80.0%
Wanting to Acquire	4	80.0%
Wanting to Access	-	0.0%
Willing to Participate	2	40.0%
Computer Users	-	0.0%

Table 17 - Programs used by Respondents

Number of respondents using:		
Software to assist in Die Casting	11	100.0%
Number using SDCE Software	5	45.5%
Number using ILZRO Software	4	36.4%
Number using COMINCO Software	4	36.4%
Number using CAD Software	3	27.3%
Number using Other Software	2	18.2%

No one expressed satisfaction with the software currently in use. These software packages were called "incomplete aids".

Table 18 - Percentage of Part Designers that also:

Design Parts	19	100.0%
Design Dies	14	73.7%
Make Dies	13	68.4%
Make Parts	16	84.2%
Supply Raw Materials	1	5.3%

Table 19 - Percentage of Die Designers that also:

Design Dies	32	100.0%
Design Parts	14	43.8%
Make Dies	22	68.8%
Make Parts	20	62.5%
Supply Raw Materials	1	3.1%

Table 20 - Percentage of Die Makers that also:

Make Dies	30	100.0%
Design Parts	13	43.3%
Design Dies	22	73.3%
Make Parts	20	66.7%
Supply Raw Materials	1	3.3%

Table 21 - Percentage of Part Makers that also:

Make Parts	29	100.0%
Design Parts	16	55.2%
Design Dies	20	69.0%
Make Dies	20	69.0%
Supply Raw Materials	2	5.2%

Table 22 - Size of Part Designers

1 - 25 employees	5	26.3%
26 - 50 employees	3	15.8%
51 - 100 employees	1	5.2%
101 - 200 employees	3	15.8%
Over 200 employees	7	36.8%
Total	19	100.0%

Table 23 - Size of Die Designers

1 - 25 employees	11	34.4%
26 - 50 employees	5	15.6%
51 - 100 employees	4	12.5%
101 - 200 employees	3	9.4%
Over 200 employees	9	28.1%
Total	32	100.0%

Table 24 - Size of Die Makers

1 - 25 employees	10	33.3%
26 - 50 employees	8	26.7%
51 - 100 employees	3	10.0%
101 - 200 employees	3	10.0%
Over 200 employees	6	20.0%
Total	30	100.0%

Table 25 - Size of Part Makers

1 - 25 employees	6	20.7%
26 - 50 employees	6	20.7%
51 - 100 employees	3	10.3%
101 - 200 employees	5	17.2%
Over 200 employees	9	31.0%
Total	29	100.0%

Table 26 - Survey of Non Respondents

Companies Telephoned	24	100.0%
Meaningfull Contacts Established	10	41.7%
Telephone Number no Longer is Service	1	4.2%

Table 27 - Survey of Non Respondents - Size

Number Contacted	10	100.0%
Less than 25 employees	5	50.0%
25 to 200 employees	3	30.0%
More than 200 employees	2	20.0%

Table 28 - Survey of Non Respondents - Interest

Number Contacted	10	100.0%
Number Interested in CIDC	3	30.0%
Number Not Interested in CIDC	7	70.0%

Table 29 - Quality of Sample Source

	Total	CRIQ's Direc.	RIE's Direc.	Cnd Trade Index	Cnd Plastic Direc.
Compagnies Chosen	268	39	75*	135	19
Percent of Sample	100	15	28	50	7
Number or Respondents	95	15	31	42	7
Percent of Respondents	100	16	33	44	7
Respondents Interested	47	8	25	11	3
Percent of Interested	100	17	53	23	6
Source Rating % of Interested / % of Sample	-	1.1	1.9	0.5	0.9

* All of RIE's entries were chosen. Some were subsequently illiminated because of duplication in other sources.

4.0 COMMENT

4.1 Potential of the CIDC software

It is felt that a well designed, affordable software package will substantially change the nature of the die casting industry. It will facilitate quick accurate communications between the part designer, the mold designer, the mold manufacturer and the part producer. A center of die casting expertise that can optimize the part design, the die design and die production may arise (as a result of introducing this software) to replace the piecemeal approach to part production that now exists.

To realize the full potential of a good CIDC software package there are three steps that must be taken: there must be effective and agressive marketing of the package, there must be installation of NC machines by the die producers, the part producer should install process control equipment on the die casting machines to maintain the optimal production environment. These steps are not necessarily IRMI's responsibility. The CIDC software alone will nct solve all the die caster's problems.

4.2 What the Die Casting Industry needs

The needs of the die designer and producer and part producer are largely coincident but the point of view is different.

The die designer and producer need to design dies that need a minimum of testing and modification to gain client approval and to be able to do so quickly. This will

decrease the elapse time from design of the part to production of the part. This is particularly critical in case of seasonal products.

The part producer needs well designed dies that optimize the use of raw material, prolong die life and minimize part finishing.

Producers of critical parts (piston heads, aircraft parts) are anxious to get dies and processes that minimize part porosity.

Part producers that have no control over part design are most interested in die design and process control. Their goal is to reduce the scrap rate.

Die and part producers now claim a first shot success rate better than 50% and want the CIDC software to do significantly better than this in order to consider its acquisition.

EXHIBIT 1

LIST OF COMPANIES POLLED

A. Crosbie Inc.	T.R. McKeown	2955 Sartelon St.	St. Laurent, Que.	H4R 1E6	3	514	332-2206
A.H. Tallman Bronze Co. Ltd.	E. Perlman	2220 Industrial St.	Burlington, Ont.	L7R 3Y8	3	416	335-3491
ACF Canada Ltd.	K. Dresser	109 East Drive	Bramalea, Ont.	L6T 1B6	2	416	791-1718
Accurcast Die Casting Ltd.	R.R. Jones	333 Arnold St.	Wallaceburg, Ont.	N8A 4L5	2	519	627-2251
Acme Slide Fastener Co. Ltd.	Y. Marinelli	225 Liege St. W.	Montreal, Que	H2P 1H4	2	514	382-2517
Acro Machine and Tool Co. Ltd.	M.J. Koskela	433 Birch Rd.	Scarboro, Ont.	M1K 1N3	4	416	694-9056
Advanced Tool and Die Co. Ltd.	A. Ducharuiy	4150 Midland Ave.	Agincourt, Ont.	M1S 3C5	4	416	291-8828
Ajax Tool Co. (Canada) Ltd.	J. Kartner	595 Mackenzie Ave.	Ajax, Ont.	L1S 2G2	4	416	683-3512
Alloy Foundry Co. Ltd.	A.W. Heroux		Merrickville, Ont.	K0G 1N0	3	613	269-4755
Alpha Engineering Corp.	L. Holec	5220 Outer Blvd.	Windsor, Ont.	N6A 6J3	4	519	737-6906
Alucast Enterprises Ltd.	G. Lebel	230 Industrial Blvd.	St. Eustache, Que.	J7R 5R4	3	514	472-5470
Alumaloy Castings Ltd.	R.K Brake	483 Eastern Ave.	Toronto, Ont.	M4M 1C2	3	416	465-6991
Aluminum Foundry and Pattern Works Ltd.	D.B. Chadwick	1345 Miron St.	St. Laurent, Que.	H4N 2C9	3	514	747-7578
Amcan Castings	J.B. Cambell	Box 446 Station B	Hamilton, Ont.	L8L 7X3	3	416	527-9178
American Brass and Aluminum Foundry Ltd.	W. Sych	3528 Station D	Edmonton, Alt.	T5L 4J3	3	403	455-6661
Amerok Inc.	T. Kovler	278 Cook St.	Meaford, Ont.	N0H 1Y0	2	519	538-2200
Anderson A.G. Ltd.	A.G. Anderson	P.O. Box 6606	London, Ont.	N5V 2Y3	4	519	455-5420
Argos Industries Ltd.	A.W. Wegner	1320 Soucy St.	St. Hubert, Que.	J4T 1A3	4	514	678-0720
Armada Tool Works Ltd.	C.J. Styles	30 Chemical Court	West Hill, Ont.	M1E 3X7	2	416	282-7974
Arnold Die Casting Co. Ltd.	L.A. Coombs	354 McNab St.	Dundas, Ont.	L9H 2L2	3	416	627-3509
Arrow Tool and Die Making Mfg. Co.	A. Lorincz	27 Greenway Ave.	Hamilton, Ont.	L8L 6C3	4	416	549-6925
Artmetal Canada	J.J. Brown	24 Mendota Rd.	Toronto, Ont.	M8Y 1E8	3	416	252-2000
Atalantic Bridge Co. Ltd.	D.A. Eisenhauer	83 Tannery Rd.	Lunenburg, N.S.	B0J 2C0	3	902	634-8821
Atelier d'Outillage B.S.P. Ltee.	B. Poliquin	658 90e Ave.	LaSalle, Que.	H8R 3A1	1	514	364-5910
Atelier de Precision Neufchatel Inc.	M. Proteau	503-A Rue St-Claude	Quebec, Que.	G2B 1H2	1	418	842-1247
Ateliers D'Usinage St-Therese Inc.	M. Therrien	20855 Ch. Cote Nord	Boisbriand, Que.	J7E 4H5	1	514	430-0030
Ateliers PAT Inc.	G. Gauthier	3525 Robert Chevalier	Montreal, Que.	H1A 3R7	1	514	642-4090
Ateliers Verbom Inc.	M. Bombardier	C.P. 550	Valcourt, Que.	J0E 2L0	1	514	532-3672
Atkins Hoyle Ltd.	E. Atkins	71 Portland St.	Toronto, Ont.	M5V 2M9	3	416	596-1818
Atwood J.M.	J.G. Richard	281 Wyecroft Rd.	Oakville, Ont.	L6K 2H2	3	416	844-3211
Aubertin Foundries Ltd.	E. Aubertin	10101 Hebert	Montreal, Que.	H1H 3W5	3	514	322-5180
Automatec Division of BGC Weco Int'l Ltd.	G. LaFlamme	7700 de la Martine	Ville D'Anjou	H1J 2A8	3	514	363-8940
Automotive Accessory Co. Ltd.	J.P. Wiebe	771 Main St.	Winnipeg, Man.	R2W 3R6	2	204	942-2514
B.M. Atelier D'Outillage Enr.	J.P. Huot	2150 Maisiin	LaSalle, Que.	H8N 2L8	1	514	365-2250
Banner Metal Products	K. Doster	1680 Kildare Road	Windsor, Ont.	N8W 2W4	2	519	256-2606
Baron Caoutchouc Ltee.	R. Andres	851 Baron	St-Jerome,Que.	J7Z 5V9	1	514	436-2433
Barschel and Company Ltd.	J. Shannon	234-26th Ave.	Lachine, Que	H8S 3Y4	2	514	637-8181
Bay Bronze Industries	A. Colonello	2200 Logan Ave.	Winnipeg, Man.	R2R 0J2	2	204	633-5650
Bearium Metals of Canada Ltd.	G.P. Palma	75 Newkirk Rd. N.	Richmond Hill, Ont.	L4C 3G4	3	416	884-6667
Behrends Bronze Ltd.	R.G. Heath	Box 8717 Station L	Edmonton, Alt.	T6C 4J5	3	403	464-5177
Bird Aluminum Foundry	D.A. Berglund	1660 Station St.	Vancouver, B.C.	V6A 2Y1	3	604	687-9481
Black & Decker Canada Inc.	P.B. Sheldon	100 Central Ave.	Brockville, Ont.	K6V 5W6	2	613	342-6641
Black Clawson-Kennedy Ltd.	R. Warburton	1144 1st Ave. W	Owen Sound, Ont.	N4K 4K9	3	519	376-8860
Brampton Foundries Ltd.	J. Sullivan	7 Selby Road	Brampton, Ont.	L6W 1K5	2	416	453-6044
Brown Foundry Ltd.	G.R. Brown	Box 778	Morrisburg, Ont.	K0C 1X0	3	613	543-2944
Burlington Die Castings Co. Ltd.	Gate	3267 Mainway	Burlington, Ont.	L7M 1A6	2	416	335-2742
Burnstein Castings Ltd.	S. Burnstein	69 Catherine St.	St.Catherines, Ont.	L2R 5E9	3	416	688-2022
CTS of Canada Ltd.	J.W. Hanley	80 Thomas St.	Streetsville, Ont.	L5M 1Y9	2	416	826-1141
Canadian Bronze Co. Ltd.	W. Reid	15 Bury St.	Winnipeg, Man.	R3E 2X7	3	204	786-6821
Canadian Buttons Ltd.	A. Taveroff	7020 Allard St.	LaSalle, Que.	H8N 1Y8	2	514	363-0210
Canadian General Electric Company Ltd.	G. Babineau	1130 Charest Boulevard	Quebec, Que.	G1M 2E2	2	418	683-3431
Canadian General Electric Company Ltd.	G. Downey	107 Park St. North	Peterborough, Ont.	K9J 7B5	2	705	748-8481
Canadian General Electric Company Ltd.	M. Dudley	265 West St.	Trenton, Ont.	K8V 2N2	2	613	392-1235
Canadian Shipbuilding and Engineering Ltd.	J.R. Elder	Huron St.	Collingwood, Ont.	L9Y 3Z6	3	705	445-4040
Canadian Stone Marine Ltd.	McLaughlin	420 9th Ave.	Iberville, Que.	J2X 1K3	3	514	347-3789

Capsule Technology International Ltd.	S. Lukas	3298 Marentette Ave.	Windsor, Ont.	N8X 4G4 4 519 969-3120
Carpenter Die Casting Co. Ltd.	N. Carpenter	540 Queen Elizabeth Hghw.	Stoney Creek, Ont.	L8E 2R3 2 416 664-4474
Celotto Tool and Mould Co. Ltd.	F. Celotto	150 Arnold St.	Wallaceburg, Ont.	N8A 3P4 3 519 627-3359
Centennial Mould and Die Ltd.	A. Sokol	58 Bigwin Rd.	Hamilton, Ont.	L8V 4L5 3 416 387-9000
Center Line (Windsor) Ltd.	F. Wigle	920 Mercer St.	Windsor, Ont.	N9A 1N6 4 519 256-5401
Center Tool and Mold Co. Ltd.	A. Van Wageningen	2466 Central Ave.	Windsor, Ont.	N8W 4J3 3 519 945-2328
Central Castings Ltd.	C.W. Fields	Box 722	Amherst, NS	B4H 1G5 3 902 667-2513
Century Products Ltd.	W. Servay	505 Louvain St. West	Montreal, Que.	H2N 1C1 2 514 387-3761
Cercast Inc.	F. Valenta	3905 Industrial Blvd.	Montreal, Que.	H1H 2Z2 3 514 322-2371
Chalvignac Ceramiques Exclusives Inc.	G. Liva	10601 Rue Racette	Montreal-Nord, Que	H1G 5H3 1 514 322-1344
Chrysler Canada Ltd.	B. Svensen	15 Brown's Line	Toronto, Ont.	M8W 3S3 2 416 259-2341
Clix Inc.	R. Wagner	3540 St.Patrick St.	Montreal, Que.	H4E 1A2 2 514 934-0331
Clover Tool Mfg. Ltd.	F. Zeni	70 Snidercroft Rd.	Concord, Ont.	L4K 2K3 3 416 669-1999
Coles J. Foundry Ltd.	Mrs. J. Coles	114 Sinnott Rd.	Scarborough, Ont.	M1L 4M9 3 416 751-7851
Cominco Ltd.	J. Grach	Sheridan Park	Mississauga, Ont.	L5K 1B4 416 822-2022
Compagnie Canada Metal Ltee.	G. Savard	6265 Notre-Dame Est	Montreal, Que.	H1N 2E9 1 514 255-3653
Compagnie Canadienne D'Oxygen Ltee.	A. Martel	3200 Sartelon	St-Laurent,Que.	H4R 1E3 1 514 332-9602
Compagnie D'Outillage Gaube Ltee.	M. Gaube	5800 Boul. Industriel	Montreal Nord, Que	H1G 3J2 1 514 324-0481
Corning Canada Inc.	J. Komnath	135 Vanderhoof Ave.	Toronto, Ont.	M4G 2J3 3 416 421-1500
Cottam Diecasting Ltd.	S. Scratch	P.O. Box 94	Cottam, Ont.	N0R 1B0 2 519 839-4892
Crane Canada Inc.	G.A. Kelly	5800 Cote de Liesse Rd.	Montreal, Que.	H4T 1B4 3 514 735-3592
Creations Le Bronzier Inc.	R. Raymond	C.P. 183	Cowansville, Que.	J2K 3H6 1 514 263-7494
Crouse-Hinds Canada Ltd.	D. Cryder	1160 Birchmount Rd.	Scarborough, Ont.	M1P 2B9 3 416 757-8781
Custom Aluminum Foundry Ltd.	R. Butler	Box 2092	Cambridge, Ont.	N3C 2V6 3 519 658-5173
DGH Foundry Ltd.	K. Silcox	1-11 Garfield Ave.	London, Ont.	N6A 4V3 3 519 434-7626
Darona Die Casting Inc.	R. Poirier	320 St.Michiel	St.Jean, Que.	J3B 1T4 2 514 348-6831
Dero Enterprises	R. Choning	9960 Plaza Boulevard	Montreal, Que.	H1H 4L6 2 514 327-1108
Diecast Products Ltd.	R. Choning	1085 Winnipeg Ave.	Winnipeg, Man.	R3E 0S2 3 204 774-1731
Diemakers Inc.	M. Normandin	1760 St-Regis	Dorval, Que.	H9P 1H6 1 514 683-1292
Douglas Inc.	J. Simpson	2070 Hadwen Rd.	Mississauga, Ont.	L5K 2C9 3 416 823-3860
Eastern Die Casting Inc.	A. Cerantola	2020 Thimens St.	St.Laurent, Que.	H4R 1L1 2 514 331-7510
Eastern Mould and Die Co. Ltd.	A.T. Szabo	5061 Amiens St.	Montreal N., Que.	H1G 3G2 3 514 648-4382
Ebco Industries Ltd.	H. Eppich	7851 Alderbridge Way	Richmond, BC	V6X 2A4 3 604 278-5578
Electrohome Ltd.	G.A. Alcock	505 Conestoga Boulevard	Cambridge, Ont.	N1R 5X9 2 519 623-6130
Electroline Manufacturing Company Ltd.	R. Lesperance	1305 Windsor Ave.	Windsor, Ont.	N9A 6M6 2 519 252-7266
Electrolux Canada	W. Sykora	2 Sheppard Ave. E	Willowdale, Ont.	M2N 6C1 3 416 224-2380
Electromac Ltd.	J. Caba	1965 Ambassador Dr.	Windsor, Ont.	N9C 3R5 3 519 969-4632
Emco Ltd.	J.W. Adams	1108 Dundas St.	London, Ont.	N6A 4N7 3 519 451-1250
Entreprise Jet Inc.	T. Spitzer	805 10e Ave.	Lachine, Que.	H8S 3G3 1 514 637-2531
Eramosa Brass and Aluminum Ltd.	A. Harrietha	120 Dawson Rd.	Guelph, Ont.	N1H 1A6 3 519 824-7121
Etatech Industries Inc.	W. Burns	58 Morrell St.	Brantford, Ont.	N3T 5N3 2 519 756-0800
Export Scovill Ltd.	S. Silverman	5570 Cartier St.	Montreal, Que.	H2H 1X9 3 514 527-9814
F.X. Drolet Inc.	G. Kirouac	245 rue du Pont	Quebec, Que.	G1L 4V4 3 418 522-5262
Fabrique de Moules Gamma Ltee.	S. Nehez	10770 Av. Alfred	Montreal Nord, Que.	H1G 5B1 1 514 325-3361
Fahramet, Div. of Indusmin Ltd.	C.M. Woodruff	Wyandotte St.	Orillia, Ont.	L3V 6L6 3 705 325-2781
Fasco Products	J.E. Faveri	101 Brisbane Road	Downsview, Ont.	M3J 3K5 2 416 661-9281
Firmex Inc.	H. Blanchet	845 Ste-Pauline	Drummondville, Que	J2B 4X5 1 819 477-3333
Fisher Gauge Ltd.	E. Belsey	194 Sophia St.	Peterborough, Ont.	K9J 6Y9 2 705 745-0567
Fisher and Son Ltd.	J.B. McColl	486 Arvin Ave.	Stoney Creek, Ont.	L8G 3X9 3 416 662-4187
Five Star Tool and Die Ltd.	Hoja	375 Arnold St.	Wallaceburg, Ont.	N8A 3P3 4 519 627-6004
Fonderie Fortin Ltd.	R. Fortin	C.P. 1370	Waterloo, Que.	J0E 2N0 3 514 539-2698
Fonderie Grand'Mere Ltee.	L. Matteau	888 7th Ave. S	Grand'Mere, Que.	G9T 5L1 3 819 538-3623
Fonderie St-Germain	V. Bergeron	348 10eme Rang	St-Germain, Que.	J0C 1K0 3 819 395-4413
Fonderie St. Romauld Inc.	G.J. Theriault	C.P. 2008	St. Romauld, Que.	G6W 5M3 3 418 839-8836

Fondremy Inc.	R. Lemair	1455 Boul. Industriel,	Chambly, Que.	J3L	4C4	3	514	685-7111
Fourway Foundry Ltd.	R. Zeleschuk	1055 East Cordova St.	Vancouver, BC	V6A	1M8	3	604	254-3922
Franklin Electric of Canada Ltd.	D.R. Smith	Highway no. 81 North	Strathroy, Ont.	N7G	3J3	2	519	245-3220
G.R. Precision Development Group	R. Garber	Unit 3, 146 Citation Dr.	Concord, Ont.	L4K	2S8	3	416	738-0493
Gallery Brass Works	J.F. James	50 Six Point Rd.	Toronto, Ont.	M8Z	2X2	3	416	236-1153
Gamma Founderies Ltd.	P. Helliwell	75 Newkirk Rd.	Richmond Hill, Ont.	L4C	3G4	3	416	884-9091
Gauvreau & Fils Ltee.	M.G. Gauvreau	595 Laurier	St-Madeleine, Que.	J0H	1S0	1	514	774-6259
General Motors of Canada Ltd.	Mr. Mitus	570 Glendale Ave.	St.Catharines, Ont	L2R	7B3	2	416	685-2011
Globe Foundery Ltd.	P. Arychuk	7647 Willard St.	New Westminster, BC	V3N	2W2	3	604	524-3881
Gordy Tool & Die Works	M. Gordy	1865 Boul. Fortin	Laval, Que.	H7S	1P1	1	514	271-1368
Grenville Castings Ltd.	J.S. Dinsmore		Merrickville, Ont.	K0G	1N0	3	613	269-4701
Gries-Dynacast	C. Tyller	2275 - 43rd Ave.	Lachine, Que.	H8T	2K1	2	514	636-4734
Gulan Die Casting Ltd.	R. Gulan	1080 Fewster Dr., No.15	Mississauga, Ont.	L4W	2T2	2	416	625-6176
H. and E. Castings Ltd.	S. Edgar Jr.	240 Bunting Rd.	St.Catherines, Ont	L2M	3Y1	3	416	682-1850
H.E. Vannatter Ltd.	H.E. Vannatter	102 Arnold St.	Wallaceburg, Ont.	N8A	4L5	3	519	627-6021
Hall and Stavert Ltd.	J.S. Stavert	West Royalty Ind. Park	Charlottetown, PEI	C1E	1B0	3	902	894-3183
Hallmark Tools Ltd.	D. Balint	Box 40 Sandwich Stn.	Windsor, Ont.	N9C	3Y6	4	519	966-4050
Harrington Aluminum Foundry Ltd.	E.W. Harrington	145 Main St.	Woodstock, Ont.	N4S	1T1	3	519	537-6711
Holophane Manville Canada Ltd.	C.S. Buckland	1620 Steeles Ave.	Brampton, Ont.	L6T	1A5	3	416	793-3111
Hoover Canada Incorporated	J.L. Wabschall	4151 North Service Road	Burlington, Ont.	L7R	4A8	2	416	335-3311
Hudson Bay Diecasting	W. Nanttel	230 Orenda Road	Brampton, Ont.	L6T	1E9	2	416	453-5010
Iberville Division	Mr. Trivily	100 Longtin St.	St.Jean, Que.	J3B	3G5	2	514	347-2304
Ideal Mold Corp. Ltd.	R. Richiati	2950 Kew Dr.	Windsor, Ont.	N8T	3G7	3	519	944-5100
Ideal Security Inc.	J. Josepe	890-90th Ave.	LaSalle, Que.	H8R	3A2	2	514	363-1030
Industrial Fine Castings Ltd.	W. Kitchen	530 Pierce Rd.	Bolton, Ont.	L0P	1A0	3	416	857-2561
Industries Abaco Inc.	R. Desy	10746 Salk Ave.	Montreal, Que.	H1G	4Y1	2	514	322-7003
Industries Coutre Ltee.	J.L. Gauthier	2007 Boul. Talbot	Chicoutimi, Que.	G7H	5H4	3	418	549-2850
Industries G.A. Ltee.	D. Labelle	C.P. 59	Amherst, Que.	J0T	2L0	1	819	687-3321
Industries G.E. Gilbert Inc.	G. Gilbert	4050 Brodeur	Sherbeooke, Que.	J1L	1V9	1	819	566-0066
Industries Gemetec Inc.	G. Pflaum	6815 St-Pascal Gagnon	Montreal Nord, Que	H1P	2V8	1	514	322-2536
Industries Normet Inc.	E. Schneider	154 Maltais	Sept-Iles	G4R	3K1	1	418	962-9705
Industries USP Inc.	G.A. Nantel	72 Queen St.	Lennoxville, Que.	J1M	2C3	3	819	562-4754
Interantional Tools Ltd.	R.E. Deane	Box 7068	Windsor, Ont.	N9C	3Y8	4	519	969-7671
Interversal Industries Ltd.	J.P. Van Schilt	1351 Hastings Crescent S.	Calgary, Alberta	T2G	4C8	2	403	243-1263
J & K Die Casting Ltd.	T. Kawaguchi	18 Golden Court	Scarborough, Ont.	M1P	3A5	2	416	293-8229
J. Kobelt Manufacturing Co. Ltd.	J. Kobelt	235 East Fifth Ave.	Vancouver, BC	V5T	1H2	2	604	879-6323
J.F.J. Mold Processors Ltd.	J.P. Robinet	3145 North Talbot Rd.	Oldcastle, Ont.	N0R	1L0	4	519	737-6772
Johns Aluminum and Brass Foundry	J. Szicsak	34 Charlton Ave.	Brantford, Ont.	N3T	5S7	3	519	752-6850
Johnson Matthey Ltd.	N. Naurauther	16 Smith St.	St.Catherines, Ont	L2R	6T7	3	416	682-9258
Joslyn Industries Ltd.	C.J. Clutterbuck	3791 Victoria Park Ave.	Scarborough, Ont.	M1W	3K6	3	416	499-5444
Jutland Tool and Die Ltd.	K. Swica	925 Kamato Rd.	Mississauga, Ont.	L4W	2R4	4	416	624-1240
Jutras Die Casting Ltd.	R.G. Webbe	41 Passmore Ave.	Agincourt, Ont.	M1S	3B2	2	416	293-2471
K and K Tools Ltd.	R. Kleiber	870 Aubry St.	St.Johns, Que.	J3B	2H7	3	514	347-4370
Kap Enterprises Ltd.	K. Pope	R.R. 1 Westfield	King's County, NB	E0C	3J0	2	506	757-2928
Kelco Tools	N. Kelz	63 Rosedale Ave.	Port Colborne, Ont.	L3K	5W1	2	416	834-6862
Kemp's Machining Co. Inc.	R.D. Paul	1620 Charles St.	Whitby, Ont.	L1N	1B9	3	416	845-2271
Kromet Handles Ltd.1977	M. Petrizt	500 Collier MacMillan Dr	Cambridge, Ont.	N1R	5W6	2	519	623-2511
L'Hoir Inc.	W. Ouellet	255 St.Laurent St.	Levis, Que.	G6V	6N8	2	418	837-4771
La Fonderie de Thetford	J.J. Paquet	700 Notre Dame St. N.	Thetford Mines, Que.	G6G	5R9	3	418	335-9149
Lamco Die Cast Ltd.	J.M. Habuda	100 Wellington St. N.	Thorold, Ont.	L2V	3Y7	2	416	227-3763
Lauder Brass Ltd.	R.W. Edmeads	107 Toryork Dr.	Weston, Ont.	M9L	1X9	3	416	741-3100
Lawton Die Cast Co. of Canada Ltd.	J. Hornick	P.O. Box 131	Strathroy, Ont.	N7G	3J1	2	519	245-4970
Lewis Tool and Die Ltd.	D. Lewis	44 Dawson Rd.	Guelf, Ont.	N1H	6N9	4	519	822-1270
Lunenburg Foundry & Engineering Ltd.	J.J. Kinley	Box 1240	Lunenburg, NS	B0J	2C0	3	902	634-8827

Luxor Industries Inc.	J. Girard	7941 Leonard de Vinci	Montreal, Que.	H1Z	3R5	3	514	721-9882
Lyster Die Casting Ltd.	C. Glazier	2555 Becanour St.	Lyster, Que.	G0S	1V0	2	819	389-5751
Machine-O-Matic Ltd.	J.M. Boehm	430 Comstock Rd.	Scarborough, Ont.	M1L	2H6	3	416	757-8820
Marwest Electric Manufacturing Ltd.	C. Ratens	111 Pacific Ave.	Winnipeg, Man.	R3B	0M1	2	204	947-1200
McCoy Foundry	A.H. McCoy	RR #1	Troy, Ont.	L0R	2B0	3	519	647-3411
Medallion Fence Ltd.	W. Hamm	10651 Keele St. North	Maple, Ont.	L0J	1E0	2	416	832-2922
Mercier Foundries Ltd.	J. Stremi	2425 Ford Blvd.	Chateauguay, Que	J6J	4Z2	3	514	691-1031
Mesotec Inc.	J. Chevrier	35 Chartier	Sherbrooke, Que.	J1J	3A9	1	819	569-2777
Metals And Alloys Co. Ltd.	J.A. Paff	1611 Rue Bercy	Montreal, Que.	H2K	2T9	1	514	522-2940
Meteor Foundry Co. Ltd.	E. Wittich	1730 Bonhill Rd.	Mississauga, Ont.	L5T	1C8	3	416	678-2890
Meteor Mold Finishing Ltd.	S. Bocska	2916 Walker Rd.	Windsor, Ont.	N8W	3R3	4	519	966-2758
Mitchell Robert Inc.	G.H. Holland	350 Decarie Blvd.	Montreal, Que.	H4L	3K5	3	514	747-2471
Modelage Drummond Inc.	E. Therrien	2080 Sigouin	Drummondville, Que	J2C	5Z4	1	819	478-2742
Modelage Simon Inc.	G. Simon	1014 Deschaillons	Sherbrooke, Que.	J1G	1X7	1	819	567-4707
Modelerie M.G. Inc.	R. Gilbert	120 Boul Industriel	Boucherville, Que.	J4B	2X2	1	514	641-0472
Monarch Fabricating and Die Casters Ltd.	D. Yarrow	45 Colville Road	Toronto, Ont.	M6M	2Y2	2	416	249-8254
Moulage Sous Pression A.M.T. Inc.	R. Tremblay	106 Cote St.	St.Cyprien, Que.	G0L	2P0	2	418	963-2606
Moulage de Precision Eastern Inc.	M. Tom	820 Rue Desaulniers	St. Laurent, Que.	H4N	1X1	1	514	337-9600
Moules Beliveau Inc.	D. Salvail	4845 Vaillancourt	Rock-Forest, Que.	J0B	2J0	1	819	864-4311
Moules L.E. Inc.	M. Lorenzo	10768 Av. Alfred	Montreal Nord, Que.	H1G	5B1	1	514	321-8181
Moules Mirplex Inc.	G. Robert	175 Rue Simard	St Jean, Que.	J3B	7X3	1	514	348-6611
Moules de Precission Italcan Ltee	A. Rosato	11475 4E Av.	Montreal, Que.	H1E	2Y8	1	514	648-5764
Mueller Ltd.	P.K. Clarke	Box 3003	Sarnia, Ont.	N7T	7M4	3	519	344-1195
National Hardware Specialties Ltd.	W. Gispen	Box 250	Dresden, Ont.	N0P	1M0	3	519	683-4451
New Glasgow Foundry Ltd.	E.K. Fraser	391 Glasgow St.	New Glasgow, NS	B2H	5C3	3	902	752-3129
Niagra Bronze Ltd.	R.E Tallman	4248 Broughton Ave.	Niagra Falls, Ont.	L2V	6V6	3	416	356-2655
Noble-Empire Awards Ltd.	R.J. Stanford	138 East Drive	Brampton, Ont.	L6T	4A4	2	416	791-7177
Non-Ferrous Castings Ltd.	R. Roak	1821 Mattawa Ave.	Mississauga, Ont.	L4X	1K6	3	416	279-1316
Norcast Inc.	L. Veilleux	105 Rue De La Foderie	Mont-Joli	G5H	3L1	1	418	775-4358
Nordic International	G.S. Cantell	1044 Rangeview, Rd.	Mississauga, Ont.	L5E	1H3	3	416	278-3331
Normandy Industries Ltd.	J.G. Brown	24 Mendota Rd.	Toronto, Ont.	M8Y	1E8	3	416	252-7177
North Simcoe Tool and Mfg.Ltd.	R. Losch	382 William St.	Midland, Ont.	L4R	4K6	3	705	526-8901
Northeast Tool & Die Works Ltd.	R. Lesperance	12663 McDougall Ave.	Windsor, Ont.	N8X	3M6	2	519	258-5942
Northern Telecom Ltd.	Mr. Hogan	P.O. Box 5155	London, Ont.	N6A	4N3	2	519	686-2000
Norwood Foundry Ltd.	R.H Buker	P.O.Box 152	Nisku, Alt	T0C	2G0	3	306	525-2528
Nye's Foundry Ltd.	R. Nye	503 Powell St.	Vancouver, BC	V6A	1G8	3	604	254-4121
Ontario Die Casting Ltd.	J. Zecca	11 Morrow Road	Barrie, Ont.	L4N	3V7	2	705	726-3219
Ontario Die Co. Ltd.	M.M. Levene	Box 70, 119 Roger St.	Waterloo, Ont.	N2J	3Z6	4	519	576-8950
Orangeville Foundry Ltd.	W. Van Realte	RR #4	Orangeville, Ont.	L9W	2Z1	3	416	946-2911
Ornamental Bronze Ltd.	E.B. Farris	2800 Olafson Ave.	Richmond, BC	V6X	2R3	3	604	273-9055
Osborne Propellors Ltd.	R.A. Osborne	1645 West 1st Ave.	Vancouver, BC	V6J	1G2	3	604	731-0461
Outboard Marine Corporation of Canada Ltd.	L.G. Groombridge	910 Monaghan Road	Peterborough, Ont.	K9J	7B6	2	705	743-2261
Outillage Gavac Inc.	R. Gagnon	10436 Boul. L'Archevesque	Montreal Nord, Que.	H1H	2Z8	1	514	321-4816
Outillage P.M. Inc.	H. Kut	5425 Boul. Industriel	Montreal Nord, Que.	H1G	3H8	1	514	322-4680
Pacific Bronze Co.	K.W. Green	1616 Pandora St.	Vancouver, BC	V5L	1L6	3	604	253-4364
Pacific Diecasting	B. Dixon	1270 Boundary Road	Vancouver, B.C.	V5K	4T6		604	299-7551
Panam Foundry Co.	B. Bains	203 Wildcat Rd.	Downsview, Ont.	M3J	2S3	3	416	663-5833
Paragon Tools Co.	M. Ladney	4050 Malden Rd.	Windsor, Ont.	N9C	3Z1	3	519	969-3181
Paramount Industries	W.H. Clement	137 Wendell Ave.	Weston, Ont.	M9N	3K9	2	416	248-0261
Peninsula Alloy Inc.	R. Cowan	4415 Buttrey Ave.	Niagra Falls, Ont.	L2E	2X2	3	416	357-4170
Pole-Lite Ltd.	C.L. Montgrain	@691 Delorimier Ave.	Longueil, Que.	J4K	3R1	3	514	670-0790
Port Arthur Shipyard Ltd.	J.R. Elder	Box 2690 Station P	Thunder Bay, Ont.	P7B	5G2	3	807	683-6261
Poterie Laurentienne Inc.	J.W. Kominik	980 Boul. de l'Industrie	St-Jerome, Que.	J7Z	5V9	1	514	432-5080
Precision Engraving Co. Ltd.	H.O. Kratz	34 Densley Ave.	Toronto, Ont.	M6M	2R1	3	416	244-1100

Precision Molds and Dies Inc.	M. Baudet	2130 Lavoisier	St. Foy, Que	G1N 4B1	4 418 683-2254
Pressed Metal Products Ltd.	A.R. Trammell	505 Alexander St.	Vancouver, BC	V6A 1C8	3 604 251-2454
Pundra Industries Ltd.	Mr. Pratzer	630 Evans Ave.	Etobicoke, Ont.	M8W 2W6	2 416 252-4635
Quick Cable Canada Ltd.	T. Matthews	528 Evans Ave.	Toronto, Ont.	M8W 2V4	3 416 252-3525
Rahn Metals & Plastics Ltd.	R.B. Ferguson	141 Regina St.	North Bay, Ont.	P1B 8H2	3 705 474-0410
Ramsden Manufacturing Ltd.	G.J.R. Ramsden	130 Oakland Ave.	Lodon, Ont.	N5W 4H6	3 519 451-6720
Richmond Die Casting Company Ltd.	P. Inoyue	P.O. Box 397	Cornwall, Ont.	K6H 5T1	2 613 931-1480
Roto-Cast Ltd.	R.B. Hill	721 Eastern Ave.	Toronto, Ont.	M4M 1E6	3 416 461-3534
Saltfleet Aluminum Foundry Ltd.	J.W. Doesborgh	328 Lake Ave.	Hamilton, Ont.	L8E 3A2	3 416 561-0033
Sangamo Canada	A.E. Van Clieaf	215 Laird Drive	Toronto, Ont.	M4G 3X1	2 416 425-3330
Shellcast Foundries Inc.	B. Morgenstern	10645 Lamoureux St.	Montreal, Que.	H1G 5L4	3 514 322-3760
Sider-Tech Ltee.	M. Desseault	630 Rue Beriault	Longueuil, Que.	J4G 1S8	1 514 670-4292
Simalex Manufacturing Co. Ltd.	G. Wentworth	19622 Telegraph Trail	Langley, BC	V3A 4P8	2 604 888-1212
Singer Company of Canada Ltd.	A. Martin	200 St.Louis St.	St.Jean, Que.	J3B 1Y1	2 514 861-3194
Siren Manufacturing Co. Ltd.	A.O. Siren	3436 15th St. SE	Calgary, Alt.	T2G 3M5	3 403 265-4212
Slacan Ltd.	G.W. Meldrum	681 King St. W.	Hamilton, Ont.	L8N 3E7	3 416 528-8888
Smith Bros. Foundry & Machine Works Ltd.	L.B. Smith	632 Pembroke St.	Victoria, BC	V8T 1H6	3 604 384-1625
Societe Manufacturiere RO-MA Inc.	C. Laing	4600 12th Ave.	Shawinigan, Que.	G9P 4E8	3 819 537-8881
Society Metroheat Incorporated	M. Paolini	4609 Iberville St.	Montreal, Que.	H2H 2L9	2 514 524-7575
Spartacan Foundry Ltd.	W.A. Melnyk	4119 17th St. SE	Calgary, Alt.	T2G 3W5	3 403 263-6480
Stackpole Machinery Co.	J.D. Tefler	3555 Danforth Ave.	Scarborough, Ont.	M1L 1E4	3 416 698-2581
Standard Brass & Aluminum Co. Ltd.	V.J. Davidian	550 York Rd.	Guelph, Ont.	N1H 6J9	3 519 822-9971
Star Expansion Shields Ltd.	H.P. Stern	1061 The Queensway	Toronto, Ont.	M8Z 1R3	2 416 259-8241
Stoermer Bell & Brass Foundry	H. Stoermer	P.O. Box 2	Breslau, Ont.	N0B 1M0	3 519 648-2281
Stuart Die Casting Company	W.M.P. Stuart	1270 Boundary Road	Vancouver, BC	V5K 4T6	2 604 299-7551
Supreca Inc.	G.R. Ross	1050 St. Amour St.	St. Laurent, Que.	H4S 1J2	3 514 337-4551
Supreme Casting & Tooling	B. Elgner	1995 Kipling Ave.	Rexdale, Ont.	M9W 4J4	3 416 743-3850
Systematic Tool & Die Co.	J.L. Moulton	431 Carlingview Dr.	Rexdale, Ont.	M9W 5G7	3 416 675-3372
T. & M. Aluminum Co. Ltd.	P. Kulyk	11 Seapack Dr.	St.Catherines, Ont.	L2M 6S5	3 416 682-2598
Techmire Ltd.	R. Frenette	4530 Clark Streeet	Montreal, Que.	H2T 2T4	2 514 354-6110
Techno Moules P.L.C. Inc.	C. Poirier	11 Rue St-Bernard	St-Damien, Que.	G0R 2Y0	1 418 789-2707
Terminal City Iron Works Ltd.	S.J. Mason	1909 Franklin St.	Vancouver, BC	V5L 1R1	3 604 253-7525
The Canada Metal Company Ltd.	K. Dunning	721 Eastern Ave.	Toronto, Ont.	M4M 1E6	2 416 465-4684
Tri-Sure Products Ltd.	P.A. Sciamonte	264 Welland Ave.	St.Catherines, Ont	L2R 6V9	3 416 685-8475
Twin City Patterns	G. Shepley	36 Worsley Court,	Cambridge, Ont.	N1R 6X3	3 519 623-4740
Unican Security Systems Ltd.	Terauds	5795 De Gaspe Ave.	Montreal, Que.	H2S 2X3	3 514 273-0451
Valiant Machine and Tool Inc.	T. Parete	7470 Tecumceh Rd.	Windsor, Ont.	N8T 1E9	3 519 944-3200
Van Berg Mfg. Ltd.	D.A. Berglund	#14-11151 Horseshoe Way	Richmond, B.C.	V6A 2Y1	3 604 687-9486
Vancouver Insland Brass Foundry Ltd.	C. Lang	638 Pembroke St.	Victoria, BC	V8T 1H6	3 604 386-2623
Vestshell Inc.	J. Valenta	10351 Rue Pelletier	Montreal Nord, Que	H1H 3R2	1 514 326-1280
Victoria Foundries Ltd.	R.W. Smith	622 Pembroke St.	Victoria, BC	V8T 1H6	3 604 384-2124
Waltec Engineering	J.A. Iles	75 Mason St.	Wallaceburg, Ont.	N8A 4L7	3 519 627-3361
Webster Mfg. (London) Ltd.	S.F. Smith	1161 King St.	London, Ont.	N5W 5K4	2 519 455-1220
Weiser Lock Inc.	R.W. Hassard	6700 Beresford St.	Burnaby, BC	V5E 1Y2	2 604 526-3641
Welco Casting Inc.	B. Warner	563 Kenilworth Ave. North	Hamilton, Ont.	L8H 4T8	2 416 549-5790
Welland Iron & Brass Ltd.	G.M. McIntyre	130 Niagra St.	Welland, Ont.	L3C 1J3	3 416 735-5676
Welsh Industrial Mfg. Ltd.	J.T. Woods	286 Arvin Ave.	Stoney Creek, Ont.	L8E 2M3	4 416 662-1475
Wilcon Products	M. Hebres	P.O. Box 509	Nobleton, Ont.	L0G 1N0	2 416 727-2146
Wilson Brass & Aluminum Foundries Ltd.	C.K. Laprairie	205 Nantucket Blvd.	Scarborough, Ont.	M1P 2P2	3 416 755-5566
Woodings Canada Ltd.	D.N. Noseworthy	P.O. Box 52	South Lancaster, Ont.	K0C 2C0	3 613 347-2485
Zollner Canada Ltd.	P.L. Bowser	Box 190	Leamington, Ont.	N8H 3W2	3 519 326-2654

EXHIBIT 2

LETTER OF INTRODUCTION

FRENCH

ENGLISH

ABBDL-TECSULT

Tecsult Inc
experts-conseils/consultants

85, RUE STE-CATHERINE OUEST, MONTRÉAL, QUÉBEC, CANADA H2X 3P4
TÉL.: (514) 287-8500 CABLE: «SULTEC» TÉLEX: 055-60122

Le 29 mars 1985

B. Morgenstern
Shellcast Foundries Inc.
10645 Lamoureux St.
Montreal, Que.
H1G 5L4

Cher Monsieur Morgenstern

Nous effectuons présentement un sondage pour le compte de l'Institut de génie des matériaux (I.G.M.), une division du Conseil national de la recherche du Canada (C.N.R.C.), afin de déterminer si l'Industrie canadienne a besoin d'un logiciel qui promettrait de préparer par ordinateur des moules haute pression intégrés. Le logiciel permettra de faciliter et d'accélérer la conception du moule et la production, ainsi que d'augmenter la qualité du produit moulé.

Le logiciel proposé (C.I.D.C. pour Computer Integrated die casting) sera destiné à aider les concepteurs de pièces, les fabricants de moules et les mouleurs. Le logiciel optimisera le processus de moulage sous pression, incluant l'alimentation, le système d'éjection, le refroidissement et l'aération, et l'assemblage du moule. Les limites du procédé seront aussi considérées, à savoir: la pression, la température et la vitesse d'écoulement, etc. toutes en fonction du matériel, de la machinerie de moulage sous pression et la conception du produit final. Le logiciel permettra aussi une analyse statique et dynamique de la résistance de la pièce qui est moulée.

Nous apprécierions grandement votre coopération pour ce sondage qui nous permettra de déterminer la nature et le niveau de besoin d'un tel logiciel. Veuillez s'il-vous-plaît prendre quelques instants pour répondre aux questions et retourner le questionnaire dans l'enveloppe affranchie d'ici le 30 avril 1985.

Même si vous ne pouvez répondre qu'à quelques questions, nous aimerions tout de même recevoir votre réponse. Une description additionnelle du logiciel est jointe au questionnaire. Advenant le cas où vous auriez certaines questions, n'hésitez pas à me rejoindre au (514) 287-8500, poste 8755. Nous acceptons les frais d'appels.

Bien à vous,

Spencer Murray
Analyste de systèmes

SM/hlv

ABBDL-TECSULT

Tecsult Inc.
experts-conseils/consultants

85, RUE STE-CATHERINE OUEST, MONTRÉAL, QUÉBEC, CANADA H2X 3P4
TÉL.: (514) 287-8500 CABLE «SULTEC» TÉLEX: 055-60122

March 29, 1985

J. Switzer
Richmond Die Casting Company Ltd.
P.O. Box 397
Cornwall, Ont.
K6H 5T1

Dear Mr. Switzer

We are a conducting market survey for the Industrial Materials Research Institute (IMRI), a division of the National Research Council of Canada (NRC), to determine whether Canadian Industry needs a Computer Integrated Die Casting (CIDC) software package. The software will facilitate and accelerate mold design and production, and increase the quality of the molded products.

The proposed CIDC software will be oriented to serving the piece designer, the moldmaker and the die caster. The software will optimize the die casting process, including material feeding, piece ejection, cooling, venting and the casting cycle. Also considered will be the processing limitations: pressure, temperature and flow rate etc. all as a function of: the material, the die casting machinery and design of the finished product. It will also permit static and dynamic stress analysis of the piece being cast.

We would greatly appreciate your cooperation in this survey to determine the nature and degree of need for such software. Please take a moment to answer the questions and return the questionnaire in the enclosed envelope by April 30th 1985.

We would appreciate receiving your response even if you can answer only some of the questions. An additional description of the software follows the questionnaire. Should you have any questions, please contact me at (514) 287-8500 Ext. 8755. You may reverse the charges.

Your's sincerely

Spencer Murray
Systems Analyst

SP/hlv
Encl.

EXHIBIT 3

QUESTIONNAIRE

FRENCH

ENGLISH

* * * TOUTE INFORMATION SERA GARDÉE CONFIDENTIELLE * * *

QUESTIONNAIRE

Pour chacune des questions à choix multiples suivantes, veuillez entourer la lettre correspondant à votre réponse.

1) Dans quelle province votre usine est-elle située?

   a) Ontario
   b) Québec
   c) Colombie Britannique
   d) Autre

2) Combien d'employés avez-vous à votre service?

   a) Moins de 25
   b) 26 - 50
   c) 51 - 100
   d) 101 - 200
   e) Plus de 200

3) Dans quelle catégorie vous classeriez-vous? (Vous pouvez encercler plus qu'une réponse)

   a) un concepteur de pièces
   b) un concepteur de moules
   c) un producteur de moules
   d) un producteur de pièces (mouleur)
   e) un fournisseur de matières premières
   f) aucune de ces réponses

4) Seriez-vous intéressé à acquérir un logiciel comme celui décrit sur la lettre d'introduction?

   Oui ☐ Non ☐

5) Seriez-vous intéressé à avoir accès au logiciel dans un bureau de service?

   Oui ☐ Non ☐

6) Seriez-vous prêt à participer au test et à la vérification du système au cours de son développement?

Oui ☐ Non ☐

7) Utilisez-vous l'ordinateur pour aider à la conception ou la production de moules ou de pièces moulées sous pression?

a) Oui, dans l'entreprise
b) Oui, dans un bureau de service
c) Non, pas du tout

Si oui, quel logiciel utilisez-vous?

8) Modifieriez-vous notre priorité de développement?
(Ceci est une question optionnelle, voir figure 1 pour notre priorité de développement)

Oui ☐ Non ☐

Si oui, quelles seraient vos priorités?

9) Commentaires

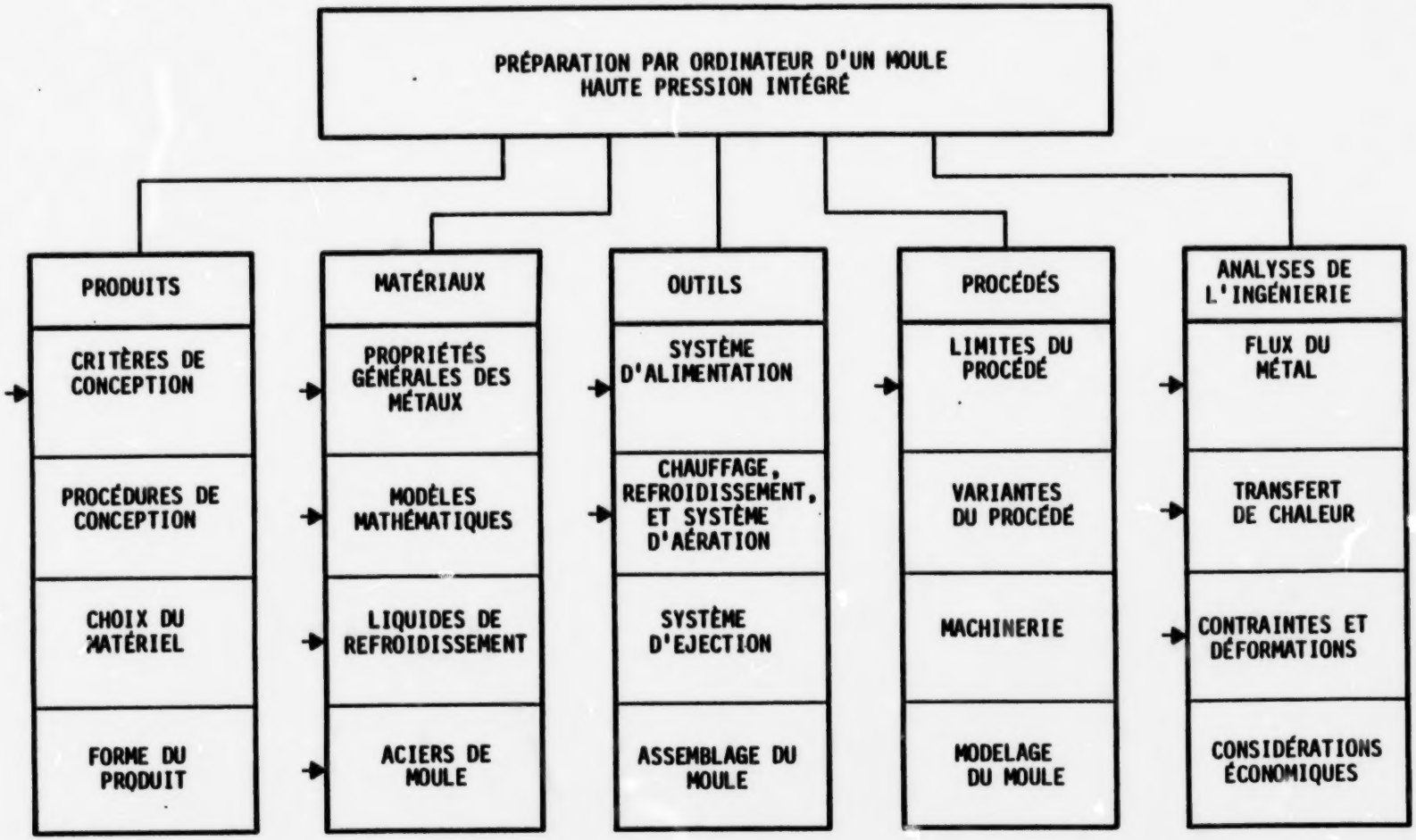

Figure 1 Le logiciel intégrera:

- la conception de la pièce
- le choix du matériel
- la conception de l'assemblage du moule
- la conception du procédé de moulage sous pression
- l'analyse de l'ingénierie et économique

Le logiciel sera développé de façon modulaire. La priorité sera donnée aux modules indiqués par les flèches. Si vous croyez que les priorités ne sont pas dans l'ordre voulu, indiquer sur le questionnaire l'ordre envisagé.

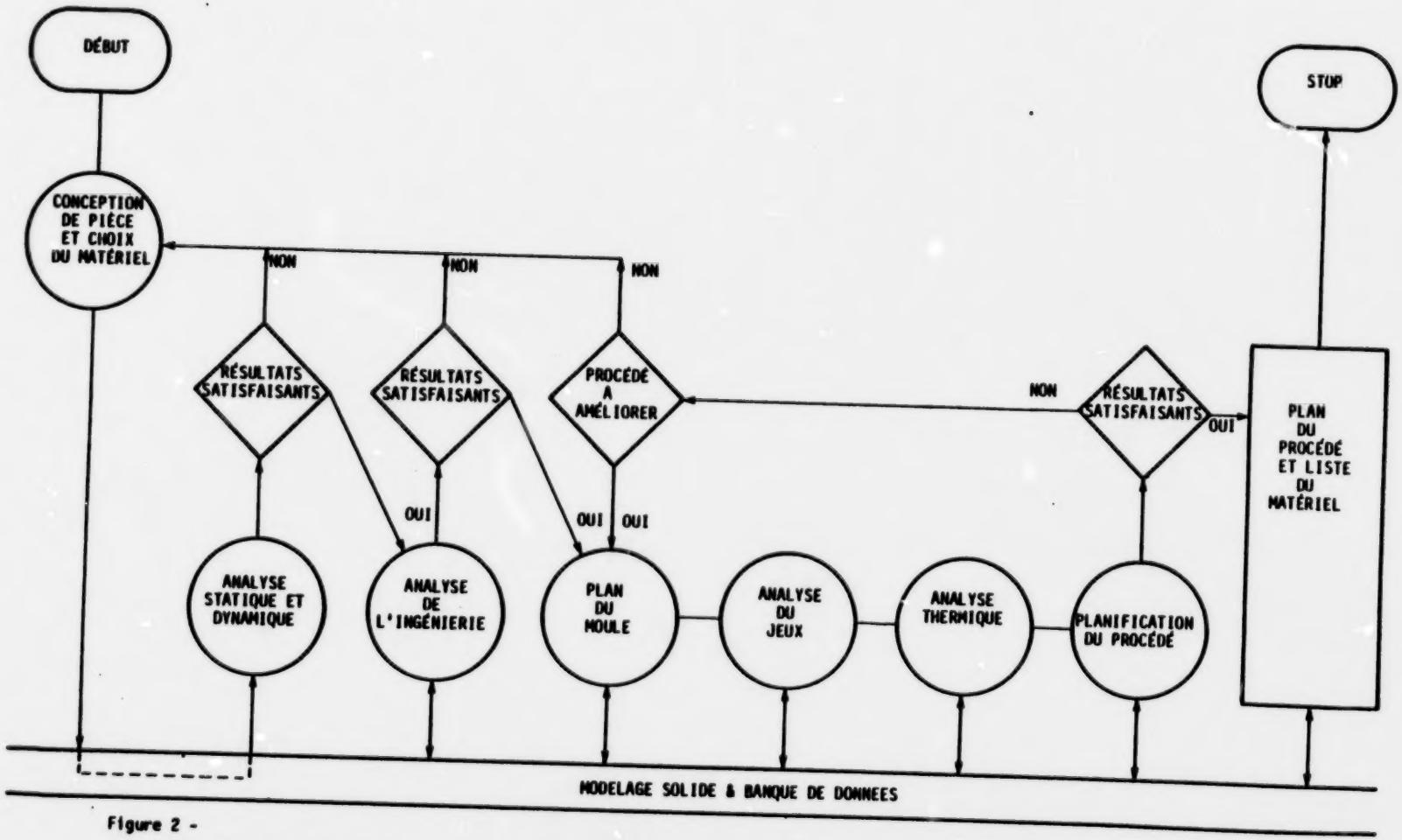

Figure 2 -

Une représentation schématique des principales étapes dans la production d'une pièce moulée sous pression en utilisant le logiciel (C.I.D.C.) est proposée. Partant d'une conception préliminaire de pièce, un modèle est préparé sur l'ordinateur, le choix du matériel est optimisé, une analyse des contraintes est effectuée et la conception de la pièce raffinée. A l'aide de la forme de la pièce et la connaissance du procédé de moulage sous pression, le taux d'alimentation est calculé. Une analyse thermique est effectuée et un plan incluant la conception des pièces et du procédé de production, est produit.

* * * ALL INFORMATION WILL BE KEPT STRICTLY CONFIDENTIAL * * *

QUESTIONAIRE

For each of the multiple choice questions that follow please circle the letter corresponding to your answer.

1) In which province is your plant located?

a) Ontario
b) Quebec
c) British Columbia
d) Other

2) How many employees do you have?

a) Less than 25
b) 26 - 50
c) 51 - 100
d) 101 - 200
e) More than 200

3) How would you describe yourself? (You may circle more than one answer)

a) a part designer
b) a mold designer
c) a mold manufacturer
d) a part producer (molder)
e) a supplier of raw materials
f) none of the above

4) Would you be interested in acquiring a software package such as described in the covering letter?

Yes ☐ No ☐

5) Would you be interested in accessing the package at a service bureau?

Yes ☐ No ☐

6) Are you willing to particate in the testing and verification of the system as it is developed?

Yes ☐ No ☐

7) Do you use the computer to assist in the design or manufacture of molds or die cast parts?

a) Yes, in house
b) Yes, at a service bureau
c) No, not at all

If yes, what software do you use?

8) Would you modify our priority of development?
(This is an optional question, see figure 1 for our priority of development)

Yes ☐ No ☐

If yes, what would your priorities be?

9) Comments.

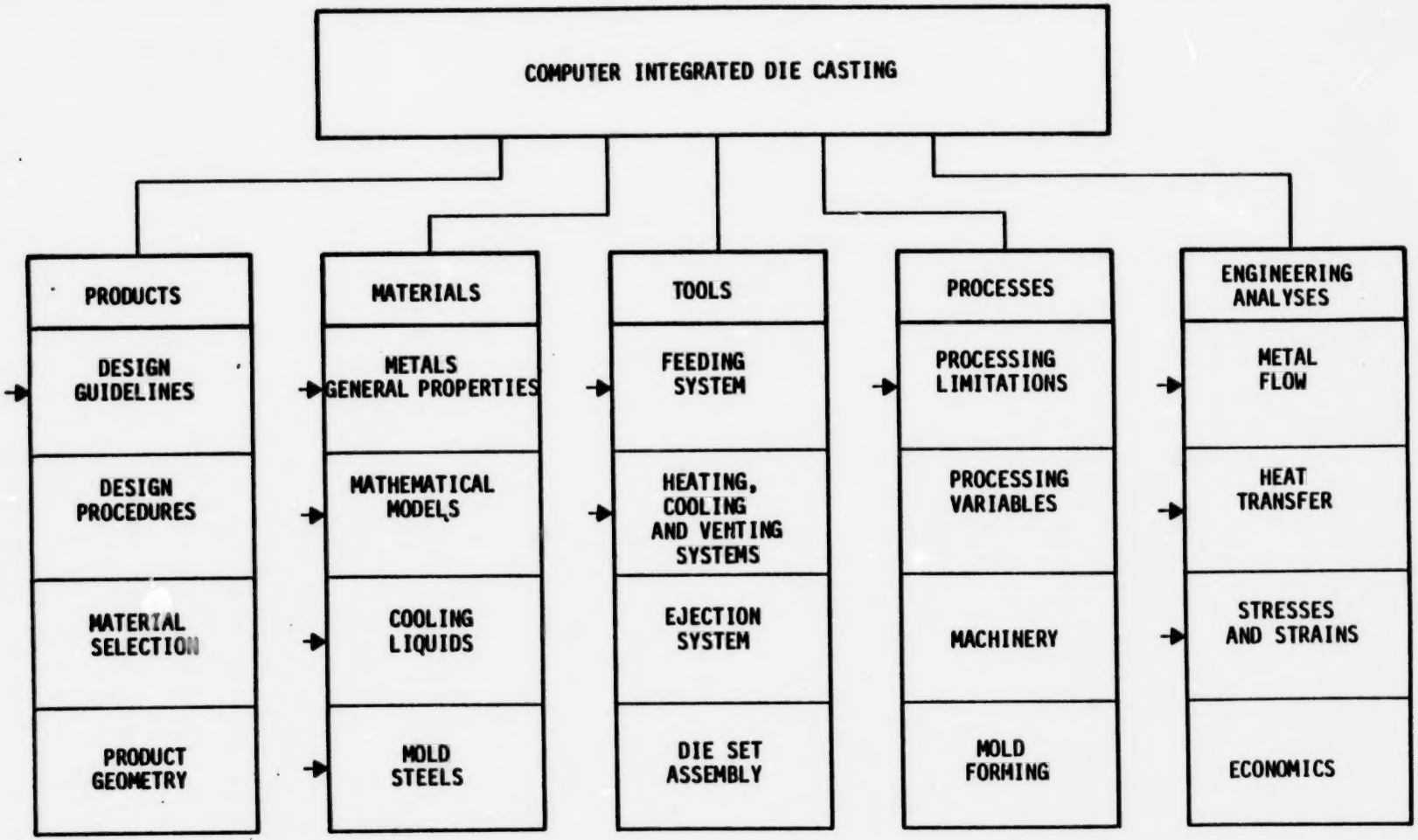

Figure 1 The software will integrate:

- the design of the piece
- the choice of material
- the design of the die assembly
- the design of the die casting process
- the engineering and economic analyses

The software will be developped modularly, the modules to wich priority will be given are indicated by an arrow. If you feel that these priorities are misplaced please indicate (on the questionnaire) how you would change the priorities.

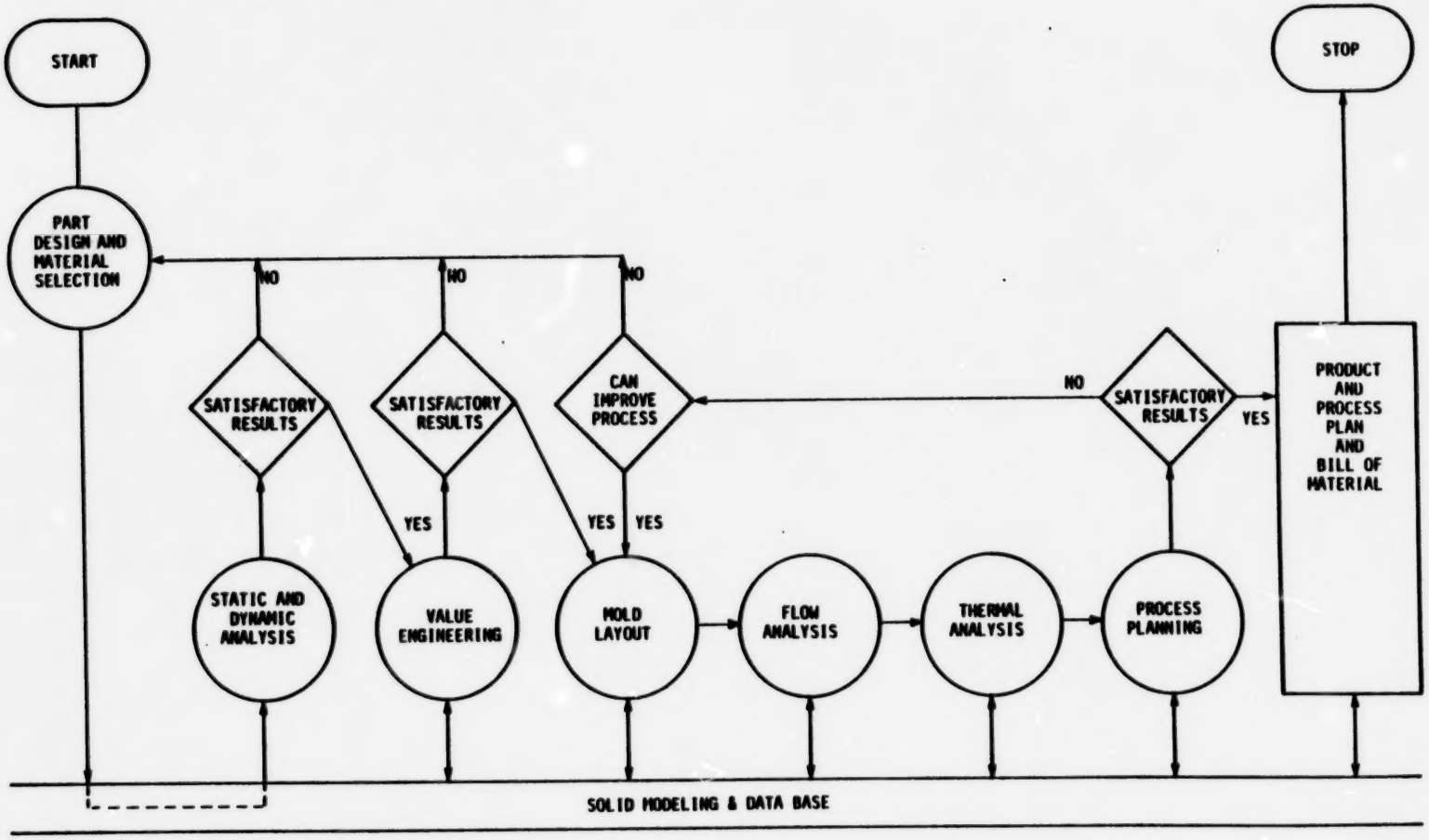

Figure 2 a schematic representation of the principal steps in the production of a piece by die casting using the propose CIDC software. Starting with a preliminary part design a computer model is prepared, the choice of material is optimized, a stress analysis is carried out and the part design is refined. Using the part geometry and die casting know how, the feeding rate is calculated. A thermal analysis is made and a plan including part design and production process is output.

EXHIBIT 4

LETTER TO GLASS AND CERAMIC INDUSTRIES

FRENCH

ENGLISH

ABBDL-TECSULT

Tecsult Inc.
experts-conseils/consultants

85, RUE STE-CATHERINE OUEST, MONTRÉAL, QUÉBEC, CANADA H2X 3P4
TÉL. (514) 287-8500 CABLE «SULTEC» TÉLEX 055-60122

Le 10 avril 1985

J. Komnath
Corning Canada Inc.
135 Vanderhoof Ave.
Toronto, Ont.
M4G 2J3

Cher Monsieur Komnath

Nous faisons un effort supplémentaire pour solliciter le point de vue des industries de verre et de céramique quant à un système CAO/FAO pour assister les mouleurs.

Si ces industries se montrent intéressées, une version spéciale du système, proposé aux mouleurs de métaux non ferreux, sera préparée. Veuillez s'il vous plaît lire la documentation si incluse en tenant compte du fait qu'elle soit préparée pour les mouleurs des métaux non ferreux.

Nous vous souhaitons bonne réception de la présente et vous prions d'agréer, Messieurs, nos sentiments distingués.

Spencer Murray,
Analyste de systèmes

SM/hlv

ABBDL-TECSULT

Tecsult Inc.
experts-conseils/consultants

85, RUE STE-CATHERINE OUEST, MONTRÉAL, QUÉBEC, CANADA H2X 3P4
TÉL.: (514) 287-8500 CABLE: «SULTEC» TÉLEX: 055-60122

April 10, 1985

J. Komnath
Corning Canada Inc.
135 Vanderhoof Ave.
Toronto, Ont.
M4G 2J3

Dear Mr. Komnath

We are making a special effort to poll the glass and ceramics industries about their interest in a CAD/CAM system for molding.

Should these industries be interested in a software package that does for them what the proposed system will do for die casters a special version of the package will be prepared. Please read the enclosed documentation making allowance for the fact that it was prepared for the die casting industry.

Sincerely yours,

Spencer Murray,
Systems Analyst

SM/hlv

EXHIBIT 5

SUMMARY TABLE OF RESPONSES

- Province - Place of business of respondent;
- Employees - Number of employees in responding firm;
- Part design - Respondent is a part designer;
- Die design - Respondent is a die designer;
- Die maker - Respondent is a die maker;
- Part maker - Respondent is a part maker;
- Supplier - Respondent is a supplier of raw materials;
- Acquire - Respondent wishes to acquire CIDC software;
- Use - Respondent wishes to access but not acquire CIDC software;
- Participate - Respondent is willing to participate in the development of the CIDC software;
- Computerized - Respondent uses a computer.

PROVINCE	EMPLOYEES	PART DESIGN	DIE DESIGN	DIE MAKER	PART MAKER	SUPPLIER	ACQUIRE	USE	PARTICIPATE	COMPUTERIZED
ALBERTA	51-100	X	X	X	X		YES	---	---	---
ALBERTA	101-200	X		X	X		YES	NO	NO	NO
ALBERTA	1- 25			X	X		YES	NO	YES	NO
BRITISH COLUMBIA	1- 25	X	X	X	X		YES	YES	YES	NO
NEW BRUNSWICK	1- 25		X				NO	NO	NO	NO
ONTARIO	51-100		X		X		YES	NO	YES	NO
ONTARIO	26- 50	X	X	X	X		YES	NO	NO	YES
ONTARIO	1- 25		X				NO	NO	NO	NO
ONTARIO	OVER 200		X	X	X		YES	NO	YES	YES
ONTARIO	OVER 200		X	X			YES	YES	YES	NO
ONTARIO	OVER 200		X				YES	YES	YES	YES
ONTARIO	OVER 200	X	X		X		YES	YES	YES	NO
ONTARIO	51-100		X	X	X		YES	NO	YES	YES
ONTARIO	101-200	X	X	X			YES	NO	NO	YES
ONTARIO	1- 25			X			YES	YES	YES	NO
ONTARIO	OVER 200	X		X	X		YES	NO	YES	YES
ONTARIO	26-50		X	X			NO	NO	NO	NO
ONTARIO	OVER 200					X	YES	NO	YES	YES
ONTARIO	101-200				X	X	YES	YES	NO	NO
ONTARIO	1- 25	X					YES	YES	NO	NO
ONTARIO	101-200		X		X		YES	YES	YES	YES
ONTARIO	1- 25		X	X			YES	NO	NO	YES
ONTARIO	26- 50			X	X		NO	NO	NO	NO
ONTARIO	51-100		X	X			NO	NO	NO	NO
ONTARIO	26- 50					X	NO	NO	NO	NO
ONTARIO	OVER 200		X		X		YES	NO	YES	YES
ONTARIO	OVER 200	X	X	X	X	X	YES	YES	YES	NO
ONTARIO	26- 50		X	X	X		NO	NO	NO	NO
ONTARIO	1- 25	X	X		X		YES	YES	YES	NO
ONTARIO	OVER 200	X	X		X		YES	YES	YES	NO
ONTARIO	OVER 200	X			X		YES	YES	YES	NO
ONTARIO	OVER 200	X	X	X	X		NO	YES	NO	YES
QUEBEC	26- 50					X	NO	YES	YES	NO
QUEBEC	26- 50	X	X	X	X		YES	YES	YES	YES
QUEBEC	101-200			X	X		NO	NO	NO	NO
QUEBEC	26- 50		X	X			YES	NO	YES	YES
QUEBEC	1- 25		X	X	X		YES	YES	NO	NO
QUEBEC	26- 50	X		X	X		YES	YES	YES	YES
QUEBEC	101-200	X	X		X		NO	YES	YES	NO
QUEBEC	OVER 200					X	NO	NO	NO	NO
QUEBEC	1- 25	X	X	X			YES	NO	NO	NO
QUEBEC	26- 50			X	X		NO	NO	NO	NO
QUEBEC	OVER 200	X	X	X	X		YES	YES	YES	NO
QUEBEC	1- 25	X	X	X	X		NO	YES	YES	YES
QUEBEC	1- 25		X	X	X		YES	YES	YES	NO
QUEBEC	1- 25		X	X			YES	YES	YES	YES
QUEBEC	1- 25		X	X			YES	YES	NO	NO

EXHIBIT 6

LIST OF RESPONDENTS

A.H. Tallman Bronze Co. Ltd.	E. Perlman	416 335-3491
Accurcast Die Casting Ltd.	R.R. Jones	519 627-2251
Acme Slide Fastener Co. Ltd.	Y. Marinelli	514 382-2517
American Brass and Aluminum Foundry Ltd.	W. Sych	403 455-6661
Amerok Inc.	T. Kovler	519 538-2200
Anderson A.G. Ltd.	A.G. Anderson	519 455-5420
Armada Tool Works Ltd.	C.J. Styles	416 282-7974
Arrow Tool and Die Making Mfg. Co.	A. Lorincz	416 549-6925
Atalantic Bridge Co. Ltd.	D.A. Eisenhauer	902 634-8821
Atelier de Precision Neufchatel Inc.	M. Proteau	418 842-1247
Atwood J.M.	J.G. Richard	416 844-3211
Automatec Division of BGC Weco Int'l Ltd.	G. LaFlamme	514 363-8940
Banner Metal Products	K. Doster	519 256-2606
Behrends Bronze Ltd.	R.G. Heath	403 464-5177
Black & Decker Canada Inc.	P.B. Sheldon	613 342-6641
Black Clawson-Kennedy Ltd.	R. Warburton	519 376-8860
Burlington Die Castings Co. Ltd.	Gate	416 335-2742
Canadian Bronze Co. Ltd.	W. Reid	204 786-6821
Canadian Buttons Ltd.	A. Taveroff	514 363-0210
Canadian General Electric Company Ltd.	G. Downey	705 748-8481
Canadian Stone Marine Ltd.	McLaughlin	514 347-3789
Capsule Technology International Ltd.	S. Lukas	519 969-3120
Carpenter Die Casting Co. Ltd.	N. Carpenter	416 664-4474
Celotto Tool and Mould Co. Ltd.	F. Celotto	519 627-3359
Cercast Inc.	F. Valenta	514 322-2371
Chrysler Canada Ltd.	B. Svensen	416 259-2341
Cominco Ltd.	J. Grach	416 822-2022
Compagnie Canada Metal Ltee.	G. Savard	514 255-3653
Compagnie Canadienne D'Oxygen Ltee.	A. Martel	514 332-9602
Corning Canada Inc.	J. Komnath	416 421-1500
Cottam Diecasting Ltd.	S. Scratch	519 839-4892
DGM Foundry Ltd.	K. Silcox	519 434-7626
Dero Enterprises	R. Choning	514 327-1108
Domglas Inc.	J. Simpson	416 823-3860
Electrolux Canada	W. Sykora	416 224-2380
Fasco Products	J.E. Faveri	416 661-9281
Firmex Inc.	H. Blanchet	819 477-3333
Fisher Gauge Ltd.	E. Belsey	705 745-0567
Fisher and Son Ltd.	J.B. McColl	416 662-4187
Five Star Tool and Die Ltd.	Hoja	519 627-6004
Fonderie Grand'Mere Ltee.	L. Matteau	819 538-3623
Fonderie St-Germain	V. Bergeron	819 395-4413
Fondremy Inc.	R. Lemair	514 685-7111
Gamma Founderies Ltd.	P. Helliwell	416 884-9091
Gauvreau & Fils Ltee.	M.G. Gauvreau	514 774-6259
Hoover Canada Incorporated	J.L. Wabschall	416 335-3311
Ideal Mold Corp. Ltd.	R. Richiati	519 944-5100
Ideal Security Inc.	J. Jospe	514 363-1030
Industrial Fine Castings Ltd.	W. Kitchen	416 857-2561
Industries Coutre Ltee.	J.L. Gauthier	418 549-2850

Industries G.A. Ltee.	D. Labelle	819 687-3321
Industries G.E. Gilbert Inc.	G. Gilbert	819 566-0066
Interversal Industries Ltd.	J.P. Van Schilt	403 243-1263
Johnson Matthey Ltd.	N. Naurauther	416 682-9258
Jutras Die Casting Ltd.	R.G. Webbe	416 293-2471
K and K Tools Ltd.	R. Kleiber	514 347-4370
Kap Enterprises Ltd.	K. Pope	506 757-2928
Lewis Tool and Die Ltd.	D. Lewis	519 822-1270
Lyster Die Casting Ltd.	C. Glazier	819 389-5751
Machine-O-Matic Ltd.	J.M. Boehm	416 757-8820
Metals And Alloys Co. Ltd.	J.A. Paff	514 522-2940
Meteor Mold Finishing Ltd.	S. Bocska	519 966-2758
Mitchell Robert Inc.	G.H. Holland	514 747-2471
Modelage Simon Inc.	G. Simon	819 567-4707
Moulage Sous Pression A.M.T. Inc.	R. Tremblay	418 963-2606
Moulage de Precision Eastern Inc.	M. Tom	514 337-9600
Mueller Ltd.	P.K. Clarke	519 344-1195
National Hardware Specialties Ltd.	W. Gispen	519 683-4451
Noble-Empire Awards Ltd.	R.J. Stanford	416 791-7177
Non-Ferrous Castings Ltd.	R. Roak	416 279-1316
Norwood Foundry Ltd.	R.H Buker	306 525-2528
Ontario Die Casting Ltd.	J. Zecca	705 726-3219
Ornamental Bronze Ltd.	E.B. Farris	604 273-9055
Outboard Marine Corporation of Canada Ltd.	L.G. Groombridge	705 743-2261
Outillage P.M. Inc.	H. Kut	514 322-4680
Pacific Diecasting	B. Dixon	604 299-7551
Poterie Laurentienne Inc.	J.W. Kominik	514 432-5080
Richmond Die Casting Company Ltd.	P. Inoyue	613 931-1480
Saltfleet Aluminum Foundry Ltd.	J.W. Doesborgh	416 561-0033
Sangamo Canada	A.E. Van Clieaf	416 425-3330
Sider-Tech Ltee.	M. Desseault	514 670-4292
Smith Bros. Foundry & Machine Works Ltd.	L.B. Smith	604 384-1625
Societe Manufacturiere RO-MA Inc.	C. Laing	819 537-8881
Society Metroheat Incorporated	M. Paolini	514 524-7575
Stackpole Machinery Co.	J.D. Tefler	416 698-2581
Stoermer Bell & Brass Foundry	H. Stoermer	519 648-2281
Techmire Ltd.	R. Frenette	514 354-6110
Techno Moules P.L.C. Inc.	C. Poirier	418 789-2707
Terminal City Iron Works Ltd.	S.J. Mason	604 253-7525
The Canada Metal Company Ltd.	K. Dunning	416 465-4684
Unican Security Systems Ltd.	Terauds	514 273-0451
Valiant Machine and Tool Inc.	M.G. Solcz	519 944-3200
Van Berg Mfg. Ltd.	D.A. Berglund	604 687-9481
Welland Iron & Brass Ltd.	G.M. McIntyre	416 735-5676
Woodings Canada Ltd.	D.N. Noseworthy	613 347-2485

EXHIBIT 7

LIST OF INTERVIEWEES

Amerok Inc.	T. Kovler	Ontario	519 538-2200
Canadian General Electric Company Ltd.	G. Downey	Ontario	705 748-8481
Carpenter Die Casting Co. Ltd.	N. Carpenter	Ontario	416 664-4474
Cominco Ltd.	J. Grach	Ontario	416 822-2022
Fisher Gauge Ltd.	E. Belsey	Ontario	705 745-0567
Jutras Die Casting Ltd.	R.G. Webbe	Ontario	416 293-2471
K and K Tools Ltd.	R. Kleiber	Quebec	514 347-4370
Moulage Sous Pression A.M.T. Inc	R. Tremblay	Quebec	418 963-2606
Richmond Die Casting Company Ltd.	P. Inoyue	Ontario	613 931-1480
Societe Manufacturiere RO-MA Inc.	C. Laing	Quebec	819 537-8881
Techmire Ltd.	M. Doucet	Quebec	514 354-6110
Valiant Machine and Tool Inc.	M.G. Solcz	Ontario	519 944-3200
Auto-trol Technology	G. Michaud	Quebec	514 739-4788